

The calibration factor is a critical component of the HSM procedure to adjust the standardized factors presented in the manual to account for local differences. This analysis focuses on calculating a calibration factor for two-lane rural road segments, including curved segments, tangent segments, and the composite (including all curves and tangents) roadway. The HSM recommends that the calibration factors should be calculated every two or three years, which will likely be a significant burden on those who wish to regularly implement the procedures in the manual. Additionally, the manual specifies a desirable minimum sample size of 30 to 50 sites which experience a total of at least 100 collisions per year. This analysis included 51 sites which experienced 85 collisions per year on average, over a five-year period (Table 1). However, these 51 sites included 26 curve segments that were selected because of their abnormally high collision history or previous identification as a hazardous location. The other 25 sites were selected randomly by arbitrarily choosing a curve site while on the way to conduct other work commitments.

The HSM calibration factors are calculated by first applying the HSM method to calculate the predicted number of crashes. This method is applied using crash data and site characteristic data (e.g. lane width, shoulder width, roadside design) for specific sites. Once these predicted numbers of crashes are found, the calibration factor is computed as a ratio of observed crashes to predicted crashes. For example, in this analysis, the observed number of curve crashes for all 51 of the segments was 35.4 and the predicted number of crashes was 12.5, resulting in a calibration factor of 2.8.

The HSM does not specify how segments should be selected or if high crash location data should be used for this purpose. Table 10 shows that the inclusion of high crash locations significantly impacts the calibration factor. For instance, when considering the curved roadway segments, the calibration factor varies from 2.82 when including all 51 sites, to 1.33 when counting only those sites which were randomly selected, to 4.49 when incorporating only the high crash sites. To meet HSM recommendations for collisions, additional sites would be needed in each sample type. For instance, if a user decided to develop a two-lane curve calibration factor based on random selected curves to meet the criteria of 100 total crashes, a total of almost 300 sites would need to be included for the analysis. Collecting the detailed data needed to calibrate the HSM for 300 curve sites would be quite labor intensive.

A paired t-test was conducted to examine the importance or need for the calibration factors shown in Table 10. The test compared the reported and predicted collisions among each sample and roadway type, which are the underlying data for the calculation of the calibration factor. The assessment found a difference in reported and predicted collision in only four of the nine sample and roadway types. Therefore, only four of the calibration factor differed significant from a calibration factor of 1.